



Predicting and mapping malaria under climate change scenarios: The potential redistribution of malaria vectors in Africa

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Abstract:

BACKGROUND: Malaria is rampant in Africa and causes untold mortality and morbidity. Vector-borne diseases are climate sensitive and this has raised considerable concern over the implications of climate change on future disease risk. The problem of malaria vectors (*Anopheles* mosquitoes) shifting from their traditional locations to invade new zones is an important concern. The vision of this study was to exploit the sets of information previously generated by entomologists, e.g. on geographical range of vectors and malaria distribution, to build models that will enable prediction and mapping the potential redistribution of *Anopheles* mosquitoes in Africa. **METHODS:** The development of the modelling tool was carried out through calibration of CLIMEX parameters. The model helped estimate the potential geographical distribution and seasonal abundance of the species in relation to climatic factors. These included temperature, rainfall and relative humidity, which characterized the living environment for *Anopheles* mosquitoes. The same parameters were used in determining the ecoclimatic index (EI). The EI values were exported to a GIS package for special analysis and proper mapping of the potential future distribution of *Anopheles gambiae* and *Anopheles arabiensis* within the African continent under three climate change scenarios. **RESULTS:** These results have shown that shifts in these species boundaries southward and eastward of Africa may occur rather than jumps into quite different climatic environments. In the absence of adequate control, these predictions are crucial in understanding the possible future geographical range of the vectors and the disease, which could facilitate planning for various adaptation options. **CONCLUSION:** Thus, the outputs from this study will be helpful at various levels of decision making, for example, in setting up of an early warning and sustainable strategies for climate change and climate change adaptation for malaria vectors control programmes in Africa.

Source: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2873524>

Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Other Climate Scenario

Other Climate Scenario: Scenario 1: A rise of 2 degrees C Africa wide temperature, 10% increase of summer rainfall and 10% decrease in winter rainfall; Scenario 2: A 0.1 degrees C rise in summer and winter maximum and minimum temperatures per degree of latitude, and a 10% increase in rainfall in summer, and 10% decrease in winter; Scenario 3: A rise of 4 degrees C Africa wide temperature, and

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20% increase of summer rainfall and 20% decrease in winter rainfall.

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Meteorological Factors, Precipitation, Temperature

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Africa

Health Impact:

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Malaria

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology:

type of model used or methodology development is a focus of resource

Exposure Change Prediction, Methodology

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:



time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content